

### AMENDMENT TO THE SPECIFICATION, 1.3.

#### **Device B, Variation of Multi knife cutting device, Inclined cutting action.**

The “variation” in the title refers to the location of the knives with respect to the guide frame. In this model the knife assembly is stationary at the bottom relative to the guide frame which is at top and rotates on a fulcrum..

Fig.no. 24. Elevatio view, Device B, Knives at bottom in fixed position.

Fig.no. 25 View in direction B, fig 24, Guide handle

Fig.no. 26 End view in direction A fig 24,

Fig.no. 27 Detail C, fig 26, assembly of knives and guides on the fulcrum.

This device is made with the aim to eliminate the work element “ pushing out the vegetables after cutting” so that cycle time is reduced. This is done by assembling the knives in a fixed position on a self supporting frame and placing the vegetables on the knives. The vegetables are pushed down through the knives by the guide frame which is attached to a handle. It has been successful in this aspect but the device is not as efficient as device B in fig 22.

#### **Part list**

Part no	Name.....	Quantity	Material.....	Dimension mm.....
1	Knife	6	SS 420	24x1thx160L
2	Handle	2	Aluminum	4x24x 230
3	Bolt,handle	2	Steel	4mm dia
4	Bolt,Grip	1	steel	4mm dia
5	Grip,handle	1	Wood	24x24x54
6	Fulcrum bolt	1	steel	4mm dia
7	Washer,fulcrum	6	Laminate	1mm
8	Flat,horizontal	2	Aluminum	6x24x182L
9	Bolt,frame	8	Steel	4 dia
10	Flat,vertical	2	Aluminum	6x24x124L
11	Guides,	7	laminate	6x60x110,U-shape
12	Spacer,base	1	wood	24x24x54
13	Bolt,spacer	1	Steel	4dia
14	Bolt,knife	2	Steel	4dia
15	Spacer,knife	7	Laminate	7x24Hx30W
16	Flat vertical	2	Aluminum	6x30x124
17	enclosure,vegetables	1	.....	50x50x25H
18	Spacer,guides	6	Laminate	2thx24Hx30L

### **Details of construction.**

The main parts are the knife assembly and the guide assembly. The knives are assembled in a self supporting frame consisting of vertical flats part 10,16, horizontal flats part 8, knives part 1, fulcrum bolt and washers 6,7, knife free end bolts 14 and spacers 15.

The frame is made ready by assembling the flats 8,10,16 with bolts as shown in fig 24. The knives with edge facing up and guides are assembled on the fulcrum bolt part 6 in the frame alternately as shown in fig 26,27,. A 1mm washer part 7 is given next to each knife(fig 27). The guides should be free to move on the fulcrum after assembly.

The free ends of the knives ( away from the fulcrum), are assembled inside the vertical flats 16, inserting one spacer 15 next to each knife and using bolt part 14. With this a gap of 7 mm is created between the knives along the length. The guides are 6 mm thick and move easily in the gap between the knives.

All the seven guides are joined to two handles part 2 with bolts part 3, fig 24. The handle makes all the U-shaped guides 11 move as a single unit. One grip part 5 is bolted at the end of the handle using bolt part 4.

One spacer part 12 is bolted to the frame at the bottom with part 13. This is to give strength to the frame. Now the assembly is complete. The guide frame is in the Start position when the handles are vertical. In this position the guides create a gap 50mm wide and 25 mm high next to the flat part 10, between the guides and knives. This enclosure is marked as part 17 in fig 24. This is the enclosure for keeping the vegetables. As the enclosure is covered on all four sides, the vegetables remain in position without holding

### **Working of the Device.**

The device is brought to start position by making the handles 2 vertical. The vegetables (5 Okra or beans etc) are placed in the enclosure 17. The handle is brought down holding the grip 5. It comes to a stop with the handle touching the spacers between the angles 16 at the knife edge level. In this stroke, the guides push the vegetables through the knives and the cut pieces fall down in the gap between the four legs at the base. The guide assembly is taken up for the next cut.

With this device some time is saved as there is no need to push the vegetables after every cut. All the guides have to be used together in this device. There is no flexibility of using 4+2 or 2+2+2 depending on the load.

**Advantages / Distinctive features :**

The vegetables fall down on the base where the device is kept at the end of the cut, eliminating the need to push out the cut pieces which is the case in the other embodiments. This reduces the cycle time.

As there are multiple knives the cutting is much faster.

The enclosure is next to the fulcrum, increasing the mechanical advantage.

There is no chance of the guides going out of alignment with the knives, as they go into the slot between the knives right from the beginning of the cut.

Knife bending is restricted by the guides as they are in touch with the knives through out the cut.

It is a novel and unique way to cut vegetables without the problems of pieces getting stuck between the knives, or the vegetables interfering with the knife frame during the cut, or incomplete cuts or knives bending and going out of alignment common with prior art.

## FUNCTIONAL DESCRIPTION.

The knife assembly is lifted up by one hand using lever 10 and moving anti clockwise. The movement should be sufficient to place vegetables on the platform. Using the second hand the vegetables are spread on the 90mm wide platform in a single layer with their length across the knives. Applying hand force at the end of the lever 10, the knife assembly is brought down on the vegetables till it comes to a rest on part 9. With this one operation all the vegetables on the platform are cut into 8mm pieces.. The cut pieces can be emptied into a tray kept beside the device by tilting the device or by pushing with a spatula. Now the device is ready for the next cut. In case of hard vegetables additional force can be applied by lifting up part 2 at the left end in addition to the downward force on lever 10 using both the hands. Force on part 2 acts as a class 1 lever. The device should be kept at the edge of a table so that part 2 of the knife assembly can move below the board level when the assembly is lifted up for placing the vegetables. The device is seven times faster and also safe as the hands are away from the knives and also the vegetables during cutting. The approach to the vegetables is also better than other models.

## VARIATION OF HEAVY DUTY MODEL. DEVICE B.

Fig. 19 shows the elevation of a second Device B model, where the position of the device for cutting is made upside down as compared to fig.16, which means the knife assembly is at the bottom and the base with platform is on top. The details are given below.

The construction of the device is same as Heavy-duty model shown in fig.16 except for lever part 10. The extended base part 8 acts as the lever, as the base is now on top. The knife assembly is without the lever as shown in fig.19 and is at the bottom. Part numbers are same as in fig.16 except for part 11 which are wooden blocks to support the device. The dotted lines in the fig.19 show the base and platform assembly in partly lifted position, with part 5 acting as the hinge.

## FUNCTIONAL DESCRIPTION.

The device is placed with the knife assembly (part 1,2,and3) resting on two wooden blocks, part 11 on any plain surface as shown in fig.19. This creates space for the vegetables to fall down by gravity at the end of cutting stroke. The base with platform ,part 6 and 8, is lifted up to make it vertical. The vegetables are spread on the knife assembly on the portion where the knives part3 are located. The base is brought down on to the vegetables, using hand force with the lever advantage. The platform ribs enter the slots between the knives after cutting the vegetables. The cut pieces fall on to the surface where the device is supported. This is an improvement over the previous mode of operation where the base part 8 is at the bottom, as the cut pieces fall down on their own, saving time and making the operation simple.